



Australian Bureau of Statistics

Education Services

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Resources



MAT 08 – Comparing Age Distributions of Indigenous and Non-Indigenous Australians

You can download this activity, the teacher solutions and the assessment rubric as a rich text file (RTF) at the bottom of the page.

Subject Area

Mathematics

Overview

ABS Demographic data comparing the age distributions of Indigenous and non Indigenous Australians is analysed and interpreted using summary statistics and parallel box plots. Note the data is presented in a grouped frequency table and so cumulative frequency using the midpoint is used to estimate centre and spread.

Requirements

- Access to CAS calculators or Excel
- Copy of student worksheet
- Optional: Computer with Internet connection

Instructions

Comparing the Age Distributions of Indigenous and Non-Indigenous Australians

Background

Every 5 years the Census collects population data and in intervening years estimated resident populations (ERP) are produced. In non-Census years 'non-Indigenous' population counts are created by subtracting Indigenous population estimates or projections from total ERP.

The following population pyramids show the projected age distributions of all Australians and Indigenous Australians for 2013 (Midway between the 2011 and 2016 Censuses). They can be found on the Australian Bureau of Statistics web site.

In this activity you will compare and report on the age distributions of Indigenous and Non-Indigenous Australians using various statistical measures and graphical displays.

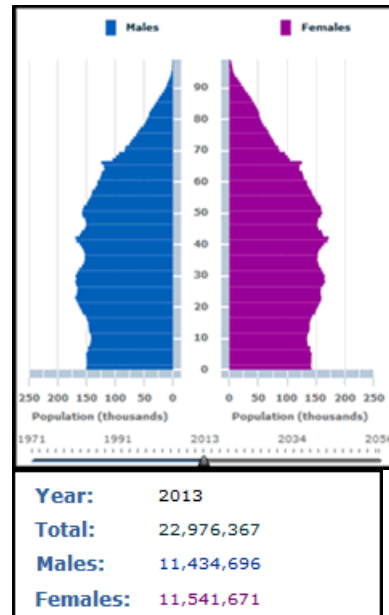


FIGURE 1: POPULATION PYRAMID ALL AUSTRALIANS
Source: ABS Animated Population Pyramid

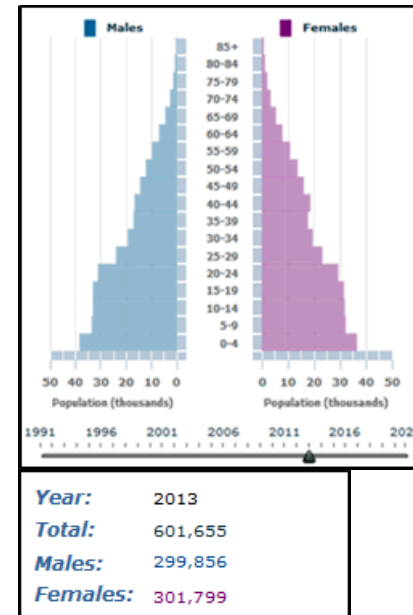


FIGURE 2: INDIGENOUS POPULATION PYRAMID
Source: TOPICS AT A GLANCE-ABORIGINAL AND TORRES STRAIT ISLANDER PEOPLES

The Data

The following data tables relate to the age distribution for NSW. Data for other states and territories can be found in the source documents shown beneath each table and could also be used to complete this activity. Note that these data use Indigenous population projections.

2010 Non Indigenous age distribution NSW

	age	(f)	Mid point	Cumulative Freq (fx)	(xf)
Male	0-4	226,319			
Male	5-9	217,298			
Male	10-14	220,475			
Male	15-19	236,065			
Male	20-24	261,039			
Male	25-29	264,284			
Male	30-34	245,265			
Male	35-39	253,463			
Male	40-44	237,849			
Male	45-49	247,840			
Male	50-54	230,688			
Male	55-59	208,542			
Male	60-64	194,287			
Male	65-69	147,190			
Male	70-74	114,214			
Male	75+	198,095			
Total (n)		3,502,913			
Female	0-4	215,586			
Female	5-9	205,875			
Female	10-14	210,686			
Female	15-19	223,909			
Female	20-24	247,048			
Female	25-29	261,413			
Female	30-34	247,162			
Female	35-39	258,658			
Female	40-44	242,457			
Female	45-49	252,016			
Female	50-54	237,360			
Female	55-59	214,243			
Female	60-64	195,635			
Female	65-69	151,500			
Female	70-74	122,807			
Female	75+	278,015			
Total (n)		3,564,370			

Figure 3: ABS catalogue number 3101.0
Australian Demographic Statistics and
ABS catalogue number 3238.0
Experimental Estimates and Projections, Aboriginal
and Torres Strait Islander Australians, 1991-2021

2010 Indigenous age distribution NSW

	age	(f)	Mid point	Cumulative Freq (fx)	(xf)
Males	0-4	10,746			
Males	5-9	9,636			
Males	10-14	9,909			
Males	15-19	9,924			
Males	20-24	7,723			
Males	25-29	6,022			
Males	30-34	4,692			
Males	35-39	4,827			
Males	40-44	4,312			
Males	45-49	3,996			
Males	50-54	3,444			
Males	55-59	2,635			
Males	60-64	1,910			
Males	65-69	1,231			
Males	70-74	786			
Males	75+	740			
Total (n)		82,533			
Females	0-4	10,172			
Females	5-9	9,067			
Females	10-14	9,377			
Females	15-19	9,435			
Females	20-24	7,088			
Females	25-29	5,807			
Females	30-34	4,903			
Females	35-39	5,263			
Females	40-44	5,029			
Females	45-49	4,660			
Females	50-54	3,665			
Females	55-59	2,789			
Females	60-64	2,166			
Females	65-69	1,342			
Females	70-74	951			
Females	75+	1,059			
Total (n)		82,773			

Figure 4: ABS catalogue number 3238.0
Experimental Estimates and Projections, Aboriginal
and Torres Strait Islander Australians, 1991-2021

Task One: Calculating Summary Statistics

Because of the amount of raw data available for population by age, it is presented in tables using 5 year intervals. One disadvantage of using data that is arranged in class intervals is that it is not possible to calculate exact measures such as mean, median and mode. Instead an estimate can be made using a mid-point to represent the data in each interval. E.g. for the age interval 0 – 4, (0, 1, 2, 3, 4) the mid-point is 2.

To make it easier to calculate and draw graphs you can copy and paste the data into an Excel or other spread sheet application. Show all calculations correct to the nearest year.

1. Measures of Centre

Using a spread sheet fill in the mid-point and cumulative frequency columns.

Step 1: Finding the estimate of the mean

$$\frac{\sum xf}{n}$$

The mean is found by = $\frac{\sum xf}{n}$

Step 2: Finding the estimate of the median

The position of the median is located by $\frac{n+1}{2}$ where n is the number of data.

Calculate the value of $\frac{n+1}{2}$ and using the cumulative frequency column, locate the interval that contains this value. Use the mid-point of this interval to fill in the estimate of the median below.

Step 3: Finding the estimate of the mode

The mode is the most frequently occurring interval. Use the mid-point of this interval to fill in the estimate of the mode.

NSW age distribution	Non-Indigenous		Indigenous	
Estimate	Males	Females	Males	Females
Mean				
Median				
Mode (excluding 75+)				

Comment

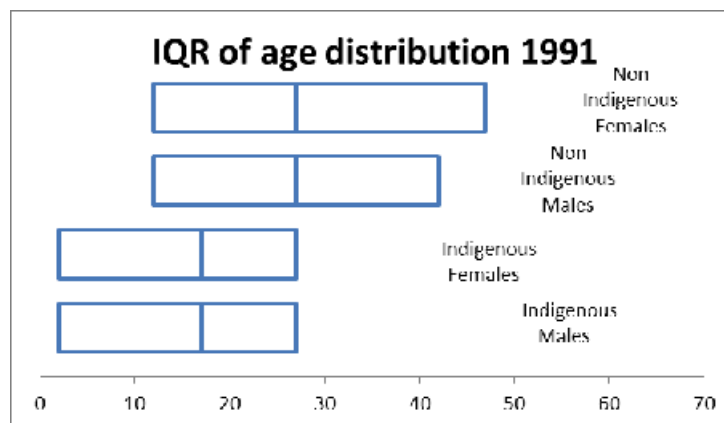
2. Measures of Spread

NSW age distribution	Non-Indigenous		Indigenous	
Estimate	Males	Females	Males	Females
Range (max – min)				
IQR (Q ₃ – Q ₁)				

Comment:

Task Two: Displaying the Data

- Using the data in Figures 3 and 4 draw a separate histogram for each group and comment on each.
- Based on the same method used to find the median, find Q1 and Q3. Use a 5 figure summary to draw parallel box and whisker plots for each group. Comment on each.
- Below are box plots from the Indigenous and non-Indigenous populations Australia for the year 1991. Comment on how the age distributions have changed since then.



Comment:

Extension

Using ABS data for a different State or Territory repeat the investigation and compare your results with those for NSW.

Downloads

Student Worksheet

RTF

Teacher Solutions

RTF

Assessment Rubric

RTF

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